MITIGATION FOR RESERVOIR PROJECTS PART III: CONCEPTS AND THEIR APPLICATION

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INTRODUCTION

Following several years of unreliable water supply, the State of Georgia has proposed the creation of a regional water reservoir program to meet anticipated increasing water demands and to safeguard against future drought periods. Between 30 and 50 drinking water supply reservoirs are proposed, including approximately 12 regional reservoirs capable of supplying water to developing population centers well into the twenty-first century.

The Final Report of the Governor's Growth Strategies Commission (GGSC 1988) recommended that the Georgia Department of Natural Resources (DNR) be responsible for leading the coordination and management of the proposed regional reservoirs. Also recognized in the Final Report was the need to protect Georgia's natural resources under increasing growth pressures. In particular, freshwater wetlands were identified as being in urgent need of a comprehensive statewide effort to define, inventory and manage existing wetlands and to acquire additional wetlands by donations and purchase.

Development of the proposed large regional reservoirs will result in negative environmental impacts to extensive areas, and many potential sites for these reservoirs are likely to include considerable wetland acreages. The resultant loss of wetlands through reservoir development on the one hand and the proposed protection of wetland resources on the other, is a daunting challenge to DNR which must juxtapose these seemingly contrasting recommendations.

A second issue facing DNR is the successful permitting of the reservoirs by the federal regulatory agencies. A critical permitting component is the successful application for a Section 404 permit to place dredge or fill material in jurisdictional wetlands. The permit is assessed by the U.S. Corps of Engineers (COE) and the U.S. Environmental Protection Agency (EPA) with review comments and recommendations from the U.S. Fish and Wildlife Service. If a project satisfies the basic recommendations and guidelines which include assessments of alternatives [40 CFR Part 230 Section 404(b)(1)], an acceptable mitigation plan must be submitted to compensate for negative impacts to, and losses of, wetlands to the extent that there is no net loss. While mitigation plans have been accepted by the COE and EPA, the longterm success of such efforts is not possible to gauge at this time and has been criticized (Race 1985, Harvey and Josselyn 1986). Ongoing research can guide plans but mitigation must be tailored for each specific site. The major components of such mitigation plans typically include a thorough environmental assessment of the existing wetlands, detailed descriptions of the methodologies and field techniques to be used, a monitoring program and a contingency plan for any unsuccessful initial mitigation or for unpredicted events (Savage 1986, Moore 1989).

Frequently, projects involving developments in wetland areas can apply measures in the design stages to avoid entirely impacts to valuable wetland resources. Also, it may be possible to accommodate existing wetlands into the overall design (for example, wetland bridging or incorporation as a positive aesthetic design component). If wetlands cannot be avoided, then mitigation plans generally include various forms of wetland creation, enhancement and restoration.

Due to the size of the regional reservoirs (typically in excess of 1000 acres), there is little opportunity for avoidance or accommodation of wetlands. Aquatic habitat will replace the majority of the area but this is not acceptable compensation for wetland losses. Some effort to minimize impacts to wetlands can be made in the site selection process by avoiding locations with large acreages of valuable wetland habitat. Also fine

realignments in dam locations can often reduce impacts. However, significant wetland impacts in the range of 100 to 500 acres should be anticipated from the development of each of Georgia's reservoirs. Due to the scale involved, these reservoirs will require the application of novel and proven mitigation techniques and their combinations to compensate for the negative impacts.

MITIGATION

On-site

To reduce the severity of the impacts, mitigation plans should emphasize on-site compensation. At a reservoir site, however, there may be limited opportunity for wetland creation and enhancement. Water inundation of areas upstream in combination with landscape and vegetation manipulation can create new wetlands or enhance existing wetlands to a more valuable habitat type. Similarly, water broadcasting over flat areas downstream from the reservoir may be possible. This creation of wetlands requires extensive mitigation plans and monitoring programs as well as considerable time and cost for implementation. For example, marshland creation costs can range from $100/ha to $2,500/ha depending upon the complexity of the system (Webb and Dodd 1978 and Demger and Nute 1979, respectively, in Moore 1989).

Landscape manipulation can include earth moving operations to create flat broad areas that will result in a suitable hydroperiod for producing wetland soil conditions and supporting wetland vegetation. Shallow water areas around the periphery of the reservoir may be developed by the creation of a littoral shelf and by planting aquatic plant species. These created and enhanced wetland areas must be protected from invasion by successional and non-wetland plant species by following a monitoring program involving the continual removal of unwanted species.

On-site mitigation for reservoirs is typically limited by the reliability of water availability due to reservoir drawdown during drought/high demand periods. Wetland areas downstream from the reservoir are particularly susceptible and would undoubtedly be jeopardized as the water supply competes between the population demand and the need for wetland maintenance.

It is important to offset the quality as well as the quantity of wetlands impacted. A first priority of any acreage created or enhanced is that it must, at a minimum, match the functions and values of the wetlands lost. Mitigation not addressing this is considered "out-of-kind" and is not readily acceptable by the regulatory agencies.

Off-site

Although less desirable than on-site mitigation, efforts to minimize losses of several hundred acres of wetland at each reservoir site will predictably have to be made off-site. The practical techniques used will be similar to on-site mitigation, particularly in restoration and enhancement. A major difficulty will be the availability and acquisition of sufficient mitigation land.

It is in this arena that state government, through DNR, can provide valuable assistance to the local water authorities and counties seeking to develop regional reservoirs. The state of Georgia is actively pursuing the purchase of additional land with a long-term goal of adding 200,000 acres to the Game and Fish Division's Wildlife Management Area (in Georgia Water Resources, January 1989). Using such state owned land as a "bank", local water authorities could apply to the land-bank for mitigation acreage. Only when all on-site mitigation planning efforts have been exhausted, can the water authorities and counties apply to the state's land-bank. To maintain an incentive to minimize the wetland impacts and to maximize on-site mitigation, some of the banked land available for reservoir mitigation should require some form of wetland restoration or enhancement to increase the acreage of wetland held in state ownership. The emphasis would be on in-kind mitigation for these off-site locations.

The acquisition of and mitigation on the banked land would carry with it a substantial financial burden; however, there are opportunities here for direct and indirect financial trade-offs between state government and the local water authorities applying to the land-bank. Direct financial trade-offs may include local taxation and revenue bond issues whereas indirect trade-offs may include temporary reductions in or restrictions for particular levels of state funding for local projects. These issues and options must be weighed at the onset of project planning and should be included in the alternative assessments made for the Section 404 permit application.

STATEWIDE PLANNING AND MANAGEMENT

By becoming involved in wetland mitigation issues, the state, through DNR, would be able to resolve the contrasting recommendations made in the Final Report (GGSC 1988). The development of a comprehensive statewide wetland resource management plan would allow the state to monitor the acreage and the quality of wetlands lost and at the same time balance such impacts through the restoration, creation and enhancement of wetlands in the land-bank.

Such a management plan should direct the allocation of wetland mitigation areas to follow an in-kind regional compensation format. For example, the state might assemble regional land-bank using the major drainage systems or geologic regions as regional categories. Application to the land-bank would be made for land within the same regional category and would be of equitable quality. In this way, wetland resources would be monitored to insure that no one particular region of the state suffered overwhelming individual or cumulative impacts to its perhaps unique wetland habitat. In time, all wetland resources in Georgia may be included in the state's mitigation inventory as either protected, impacted or available for mitigation.

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